MARINE FORCES RESERVE

The following is a Health Promotion Brief brought to you by:
Marine Forces Reserve
Semper Fit
Health Promotions

MCCS
MARINE CORPS Community Services

UNITED STATES MARINE CORPS
SEMPER FIT
SPORTS, RECREATION & FITNESS

Nutrient Timing

Overview

- Nutrient timing framework
- General recommendations
- Timeline
  - Before training
  - During training
  - After training
- Hydration
- Supplements

Nutrient Timing Framework

- Eat to train! We do ***not*** train to eat
- Volume and intensity of training
- Period of time between training sessions
- Important for recovery
- Vital for adaption

General Recommendations

- Aim for carbs and protein at every meal
  - Carbs and fat are primary fuel sources; protein is a repair source
  - Limit fat/fiber before training
- Eat 5-6 small meals/day
- Fruit or vegetable at every meal
- Do not overly restrict your calories
  - Your body weight (*e.g.* 150lb) + “0” at the end = minimum 1500 calories/day (estimate)
- Eat breakfast!
  - Oatmeal with berries, nuts and low-fat milk
  - Toaster waffle with low-fat yogurt and berries
  - Eggs, whole wheat toast and orange juice
  - Breakfast burrito (whole wheat tortilla, 2 eggs, low-fat cheese, veggies, salsa, beans)

Nutrient Timing Framework

- Glycemic response
  - Stable blood glucose (blood sugar)
  - Carbohydrates (glucose)
  - Insulin
- Glycemic index
- Glycemic load
  - (GI x grams) / 100 = GL

Nutrient Timing Timeline

- Before training
- During training
- After training

Nutrient Timing Timeline

- Before training
  - Practice your pre-event meal and snack during training
  - Right before competition, do *NOT*:
    - Try new foods
    - Eat foods that cause GI stress
      - beans
      - Fatty foods (greasy hamburger and fries)
      - Cabbage, broccoli, cauliflower
      - Popcorn
      - High sugar foods, drinks or candy

Before training

- > 2 hours before training
- 1-2 hours before training
- < 1 hour before training

Before training

- > 2 hours before training
  - Turkey and Swiss cheese sandwich with fruit
  - Whole wheat bagel, low-fat cream cheese & banana
  - Pasta with tomato based sauce
  - Baked potato and low-fat filling
  - Fruit smoothie, ***not*** protein smoothie!
    - Low-fat milk, fruit, low-fat yogurt

Before training

- 1-2 hours before training
  - Fresh fruits
  - Yogurt
  - Whole wheat bread and pasta
  - Baked chicken with rice pilaf and veggies

Before training

- < 1 hour before training
  - Apples, watermelon, peaches, grapes and oranges
  - Bowl of cereal and low-fat milk
  - 100% fruit juice
  - 6oz low-fat chocolate milk

Before training

- Carb Loading
  - Glycogen depletion is a major cause of fatigue during long duration exercises (greater than 60-90 mins)
  - Goal is to increase muscle and liver glycogen stores prior to event
  - Increasing carbs and tapering training in the 3 days leading up to the event can DOUBLE the amount of stored glycogen
    - on average, a person has about 1600-1800 calories from carbs stored at any given time
    - Doubling this = 3600 calories

Cutting Weight & Carb Loading

- Cutting weight happens
- Replenishment is important
  - Fluids only for 1-2 hours, slowly
    - Can only absorb 1 liter/hour
    - Water alone could deplete sodium even more
    - Focus on electrolytes
    - Goal = 1.5x amount of fluid lost
  - Eat small and often
    - 4:1 carb to protein ratio
    - Baby food, easily digestible
    - Within 2.5 hours of weigh in
      - 9.5 calories/pound
      - 15 mg sodium/pound
      - 13 mL fluid/pound
        - » 20% of recommendation every 30 mins
- Takes at least 20 hours to completely restore glycogen, when nutrition is optimal

During training

- Training lasting < 45 mins
  - not necessary or practical
- High intensity exercise, 45-75 mins
  - Small amounts of sports drink/food
- Endurance & intermittent high intensity, 1-1.5 hours
  - 30 to 60g/hr
- Endurance, 2.5 hours and beyond
  - Up to 80-90g/hour

During training

- High glycemic response
- Usually carbohydrate alone
  - If prolonged endurance, add amino acids
    - Glutamine
    - Branched Chain Amino Acids

During training

- Sports drinks
  - For exercise lasting longer than 1 hour
  - Do *NOT* dilute sports drinks with water
  - Look for:
    - 20 to 50 milligrams of potassium per 8 ounces
    - 12 to 24 grams of carbohydrate per 8 ounces
    - 110 to 170 milligrams of sodium per 8 ounces

During training

8 oz =

30 mg potassium
14 g carbs
110 mg sodium

12 oz bottle =

48.8 mg potassium
.1g carbs
81 mg sodium

20 oz =

175 g potassium
4 g carbs
0 g sodium

After training

- “Recovery window”
  - Help prevent additional protein breakdown
  - Attenuate the cortisol response
- Carbs and protein
  - Activate different but cooperative signaling pathways
  - 1.2-1.5g carb/kg & .4-.6g protein/kg
- 2 hours post
  - Continue consuming foods with low to moderate glycemic response
  - 1.2-1.5g carb/kg & .4-.6g protein/kg

Table 1
Nutrient timing outcome overview

Nutrient(s)	Glycogen resynthesis	Reduce muscle soreness	Increase protein synthesis	Suppress protein breakdown
Carbohydrate	Yes	No	No	Yes
Protein	No	Yes	Yes	No
Carbohydrate plus protein	Yes	Yes	Yes	Yes

After training

- Cycling Study
  - Carb and protein consumed immediately or 3 hours after moderate cycling training
  - Immediately after
    - Whole body protein synthesis was increased by 300%
  - 3 hours post
    - Whole body protein synthesis was increased by 12%

After training

- Examples
  - 8-16oz chocolate milk
  - Peanut butter and banana sandwich, glass of low-fat milk
  - Greek yogurt and fresh fruit
  - Tuna in water with Triscuits, provolone cheese and fruit
  - Microwave burrito (Evol, Amy’s) and fruit
  - Chicken strips (Perdue Shortcuts), microwave brown rice, frozen veggies and fruit

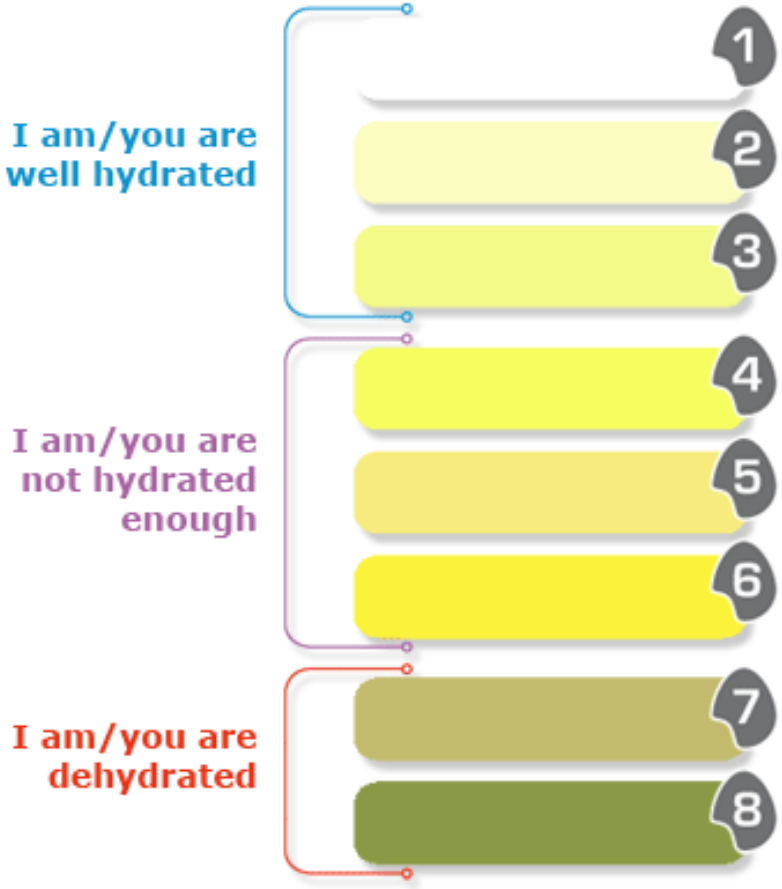
Hydration

- Necessary for maximum performance
- Plays a critical role in regulating body temperature
- Carries nutrients throughout the body
- Improves digestion
- Eliminates waste and toxins from the body

Hydration – Symptoms of Dehydration

- Moderate
  - Thirsty
  - Headache
  - Dry mouth
  - Dry skin
  - Fatigue
  - Dizzy
- Severe
  - Chills
  - Increased heart rate
  - Muscle cramps
  - Nausea/vomiting
  - Swollen stomach
  - Confusion

Hydration


I am/you are well hydrated
I am/you are not hydrated enough
I am/you are dehydrated
1
2
3
4
5
6
7
8

Hydration

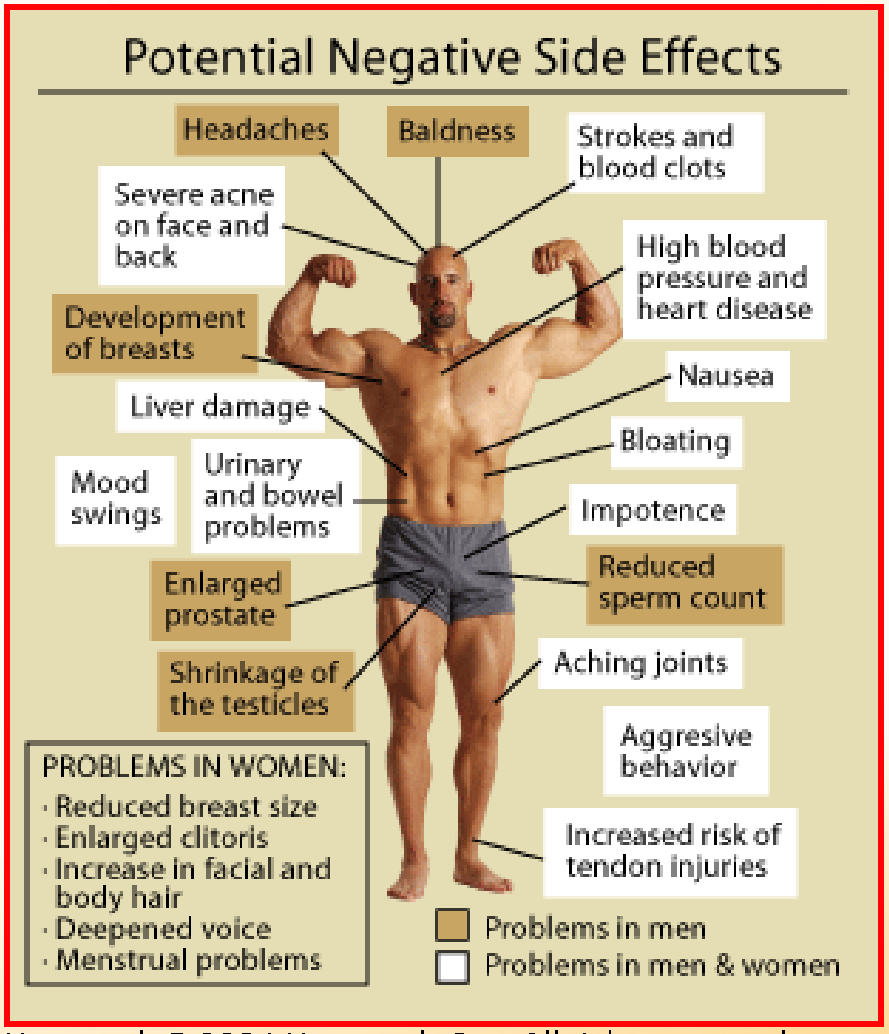
- Loss of 2% body weight
  - Increased perceived effort
  - Reduced performance by 10 to 20%
  - 2% = 3lbs for 150lb athlete
- Loss of 3-5% body weight impairs
  - Reaction time
  - Judgment
  - Concentration
  - Decision making ability
  - Body temperature regulation
  - Brain function

Hydration

- Daily water requirement
  - Body weight in pounds divided by 2 = ounces per day (does not include exercise)
  - 150lb divided by 2 = 75 ounces water/day
  - Half gallon = 64 ounces
- With exercise add:
  - 16 ounces 2 hours prior to training
  - 4-8 ounces 10 minutes prior (1 large gulp = 1 ounce)
  - 4-8 ounces every 20 minutes during
  - 24 ounces for every pound lost during exercise

Supplements

- What is a dietary supplement?
- Dietary Supplement and Health Education Act
- Guidelines for evaluating dietary supplements



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What is a dietary supplement?

- A dietary supplement is a product that contains one or more dietary ingredients intended to supplement the diet
  - Macronutrients
  - Vitamins, minerals, amino acids
  - Herbs or other botanicals
  - “other”

Branched-Chain Amino Acids: Supplements v. Real Food

Protein Source	Isoleucine (G)	Leucine (g)	Valine (g)
Met Rx Whey (1 scoop)	1.4	2.3	1.3
2 amino acid supplements	1.0	1.4	.8
Chocolate Milk (16oz)	1.2	1.9	1.1
Cottage Cheese (1 cup)	1.7	3.0	1.7
Tuna (6oz)	2.0	3.5	4.5
Chicken/Turkey (6oz)	2.0	3.5	2.5
Lentils (1 Cup)	1.3	1.7	1.2

Branched-Chain Amino Acids: Supplements v. Real Food Costs

	Protein g / serving	$ / serving
Egg Whites, 2	7	$.21
Powdered milk, 1/4c	8	$.21
Meat, deli, 4 oz	32	$1.25
Tuna, 6oz	40	$1.00
Protein Bar	23	$2.29
MetRx, 1 pkt	38	$2.70

Dietary Supplement and Health Education Act

- Signed into law October 2004
- Manufacturers can claim *anything* except:
  - Product prevents, cures and/or treats disease unless there is overwhelming scientific evidence to support that claim
- Subject to *limited* pre-market review & *no* pre-market approval
  - No formulation standards
  - No product registration
  - Manufacturer is responsible for ensuring safety and compliance

Evaluating a dietary supplement

- Does it make unrealistic promises?
- Does it have a “secret” ingredient or proprietary blend?
- Is it promoted by a celebrity?
- Do you know what the ingredients are?
- How was the product tested?
- What’s the cost compared to a food equivalent?
- Does it sound to good to be true?

DIETARY SUPPLEMENT
USP
VERIFIED

APPROVED
QUALITY
CL
ConsumerLab.com

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Review

- Nutrient timing framework
  - Stabilize blood glucose is ultimate goal
- General recommendations
  - 5-6 meals/day
  - Do not overly restrict calories
  - Fuel from carbs and fat, protein for repair
  - Fruit or veggie at every meal
- Timeline
  - Before training
  - During training
  - After training
    - Carbs and protein together
- Hydration – ½ your body weight daily
- Supplements – food first!

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